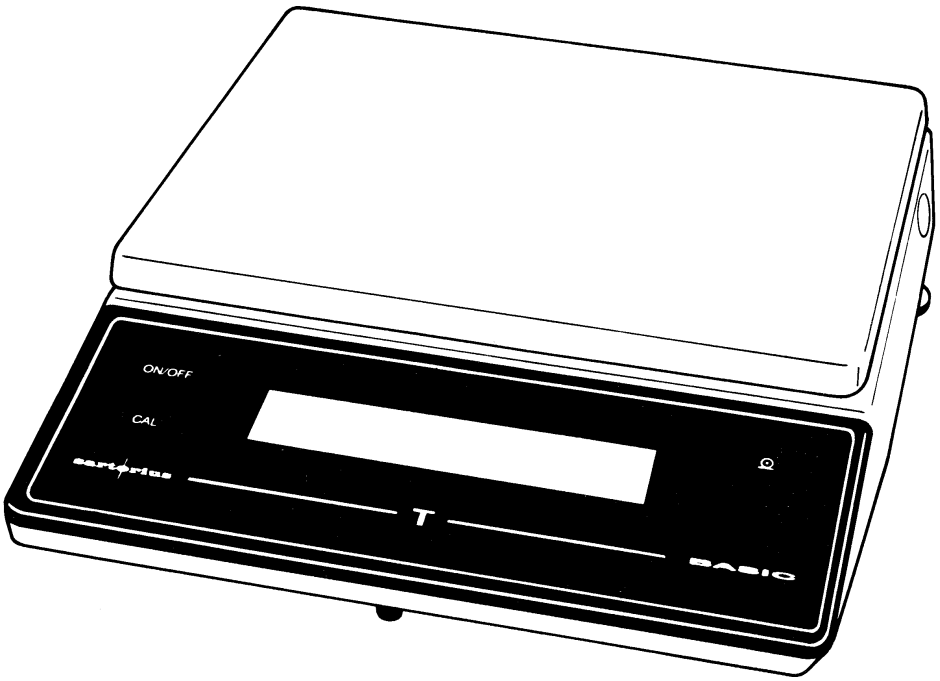
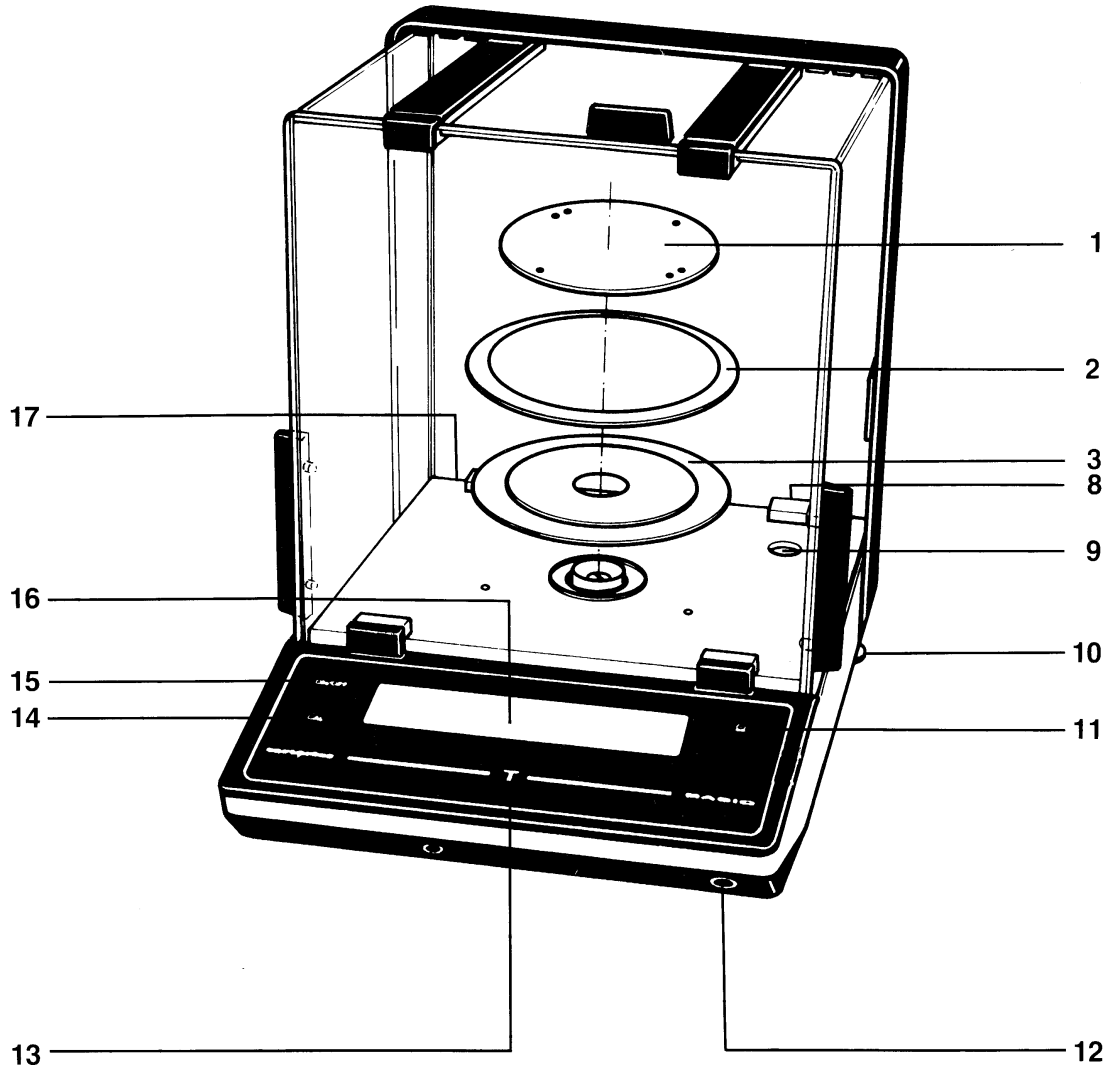
Sartorius
Basic Series

Electronic Analytical and Precision Balances
Installation and Operating Instructions

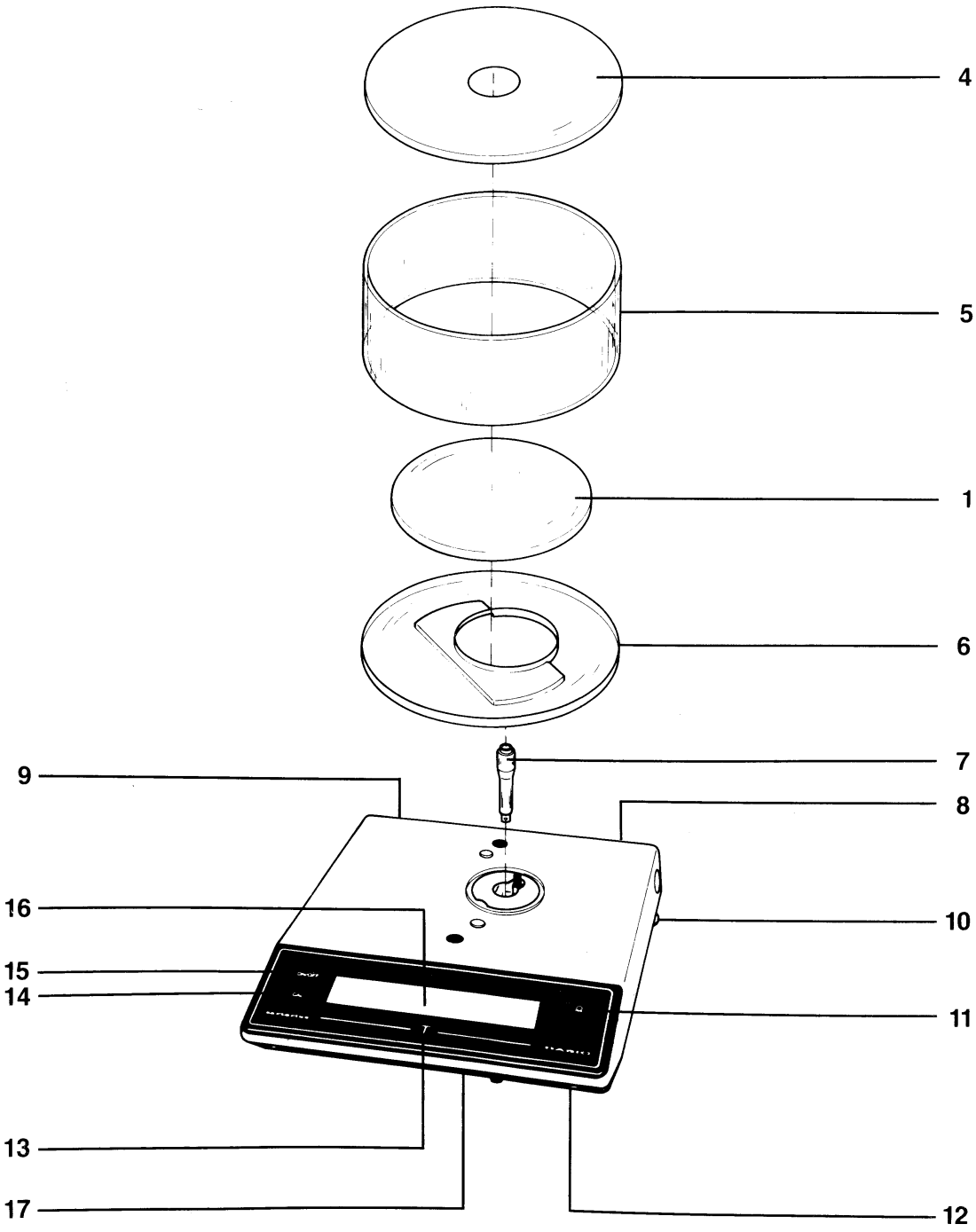


sartorius

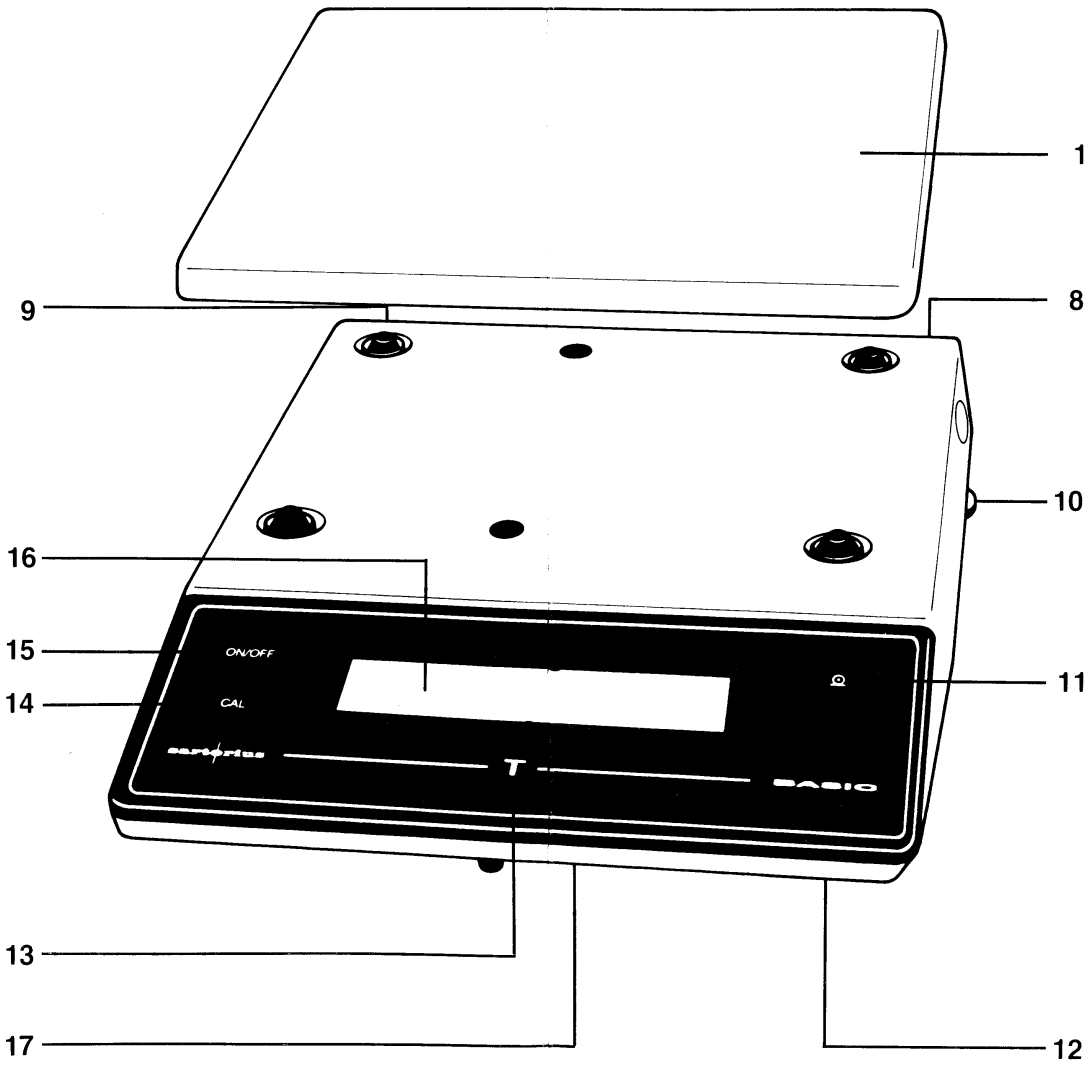
B 120S



B 310P, B 310S



B 410, B 610, B 3100P,
B 3100S, B 4100, B 6100



1 Weighing pan

2 Protective ring (only for B 120S)

3 Shield plate (only for B 120S)

4 Round draft shield lid (only B 310P and B 310S)

5 Glass draft shield cylinder (only B 310P and B 310S)

6 Base plate shield cylinder (only B 310P and B 310S)

7 Pan adapter (only B 310P and B 310S)

8 Power receptacle

9 Level indicator (only B 120S, B 310P, B 310S, B 3100P and B 3100S)

10 Leveling foot (only B 120S, B 310P, B 310S, B 3100P and B 3100S)

11 PRINT key (functions only if the balance has a built-in interface)

12 Menu access switch

13 Tare control

14 CAL key for calibration

15 ON/OFF key

16 Weight display

17 Manufacturer’s label

Sartorius
Basic Series

With this Sartorius Balance, you have acquired a high-quality electronic precision weighing instrument that will help ease your daily workload.

Please read these installation and operating instructions carefully before operating your new balance.

Pursuant to the German Directive for the Implementation of Regulations for Prevention of Accidents "Elektrische Anlagen und Betriebsmittel (VBG4)" [Electrical Installations and Equipment] of April, 1986, it is hereby certified that the equipment delivered, "Electronic Analytical or Precision Balance of the Basic Series," is manufactured and tested in compliance with the following DIN/VDE regulations

DIN IEC 348/VDE0411
Safety requirements for electronic measuring apparatus

DIN IEC 380/VDE 0806
Safety of electrically energized Office machines

DIN IEC 601/VDE 0750
Safety of medical electrical equipment

and with Article 10 of the Low-Voltage Directive 73/23/EEC issued on February 19, 1973, by the European Community.

When you use electrical equipment in installations and under ambient conditions requiring higher safety Standards, you must comply with the provisions as specified in the applicable regulations for installation in your country.

Contents

	Page
Equipment Supplied	8
Installation Instructions	9
How to Start Up the **B 120 S**	10
How to Start Up the **B 310P and B 310S**	11
How to Start Up the **B 410, B 610, B 3100P, B 3100S, B 4100, and B 6100**	12
Operation	13
Calibration	15
Balance Operating Program	16
Troubleshooting Guide	19
Accessories	20
Specifications	22

Equipment Supplied

B 120S	B 310P, B 310S	B 410, B 610, B 3100P, B 3100S, B 4100, B 6100
- Balance - AC adapter - Dust cover - Weighing pan - Protective ring - Shield plate	- Balance - AC adapter - Dust cover - Pan adapter - Base plate of the round draft shield - Weighing pan - Glass draft shield cylinder - Round draft shield lid	- Balance - AC adapter - Dust cover - Weighing pan

Do not miss out on the benefits of our warranty. Please complete the warranty registration card, indicating the date of installation, and return the card to your Sartorius dealer.

Installation Instructions

Please choose a suitable place to set up your balance. It should not be exposed to the following:

- heat radiation
- aggressive/corrosive environments
- vibrations
- drafts.

Despite unfavorable operating conditions, your Sartorius Balance will deliver accurate results because you can adapt it to your particular requirements and to the specific ambient conditions simply by changing the menu code settings in the balance operating program.
For this purpose, please read pages 16 to 18.

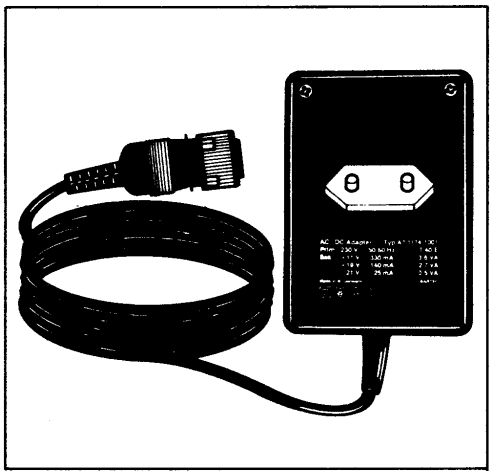
After you have plugged your balance into an electrical outlet using the AC adapter, allow for at least 30 minutes' warmup.

Important Note

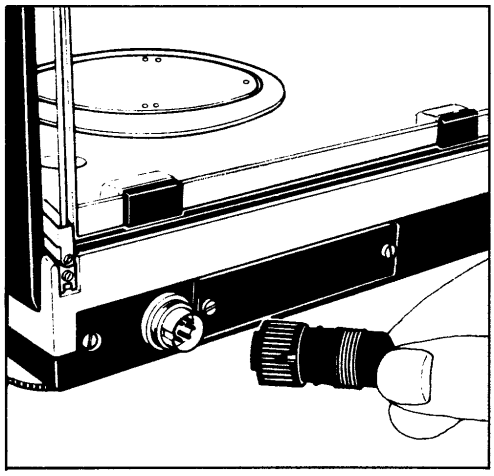
Make sure to unplug the AC adapter from the electrical outlet before you connect or disconnect additional devices (printer or PC) to the balance interface connector (Option).

How to Start up the B 120S

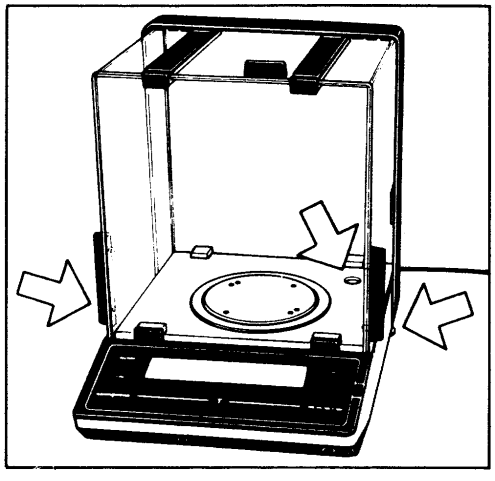
Install the components **(3-1)** in the weighing chamber one at a time in the order indicated.



Your balance is powered by an AC adapter.
Make sure that the voltage rating printed on this unit is identical to your local line voltage rating.



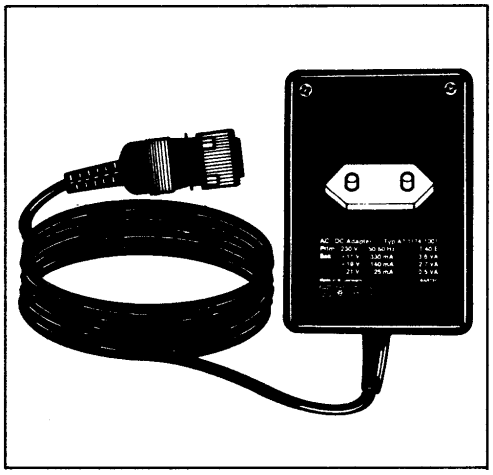
Plug the cord of the AC adapter into the power receptacle. Secure the connection by tightening the knurled collar. Now plug the AC adapter into an electrical or wall outlet.



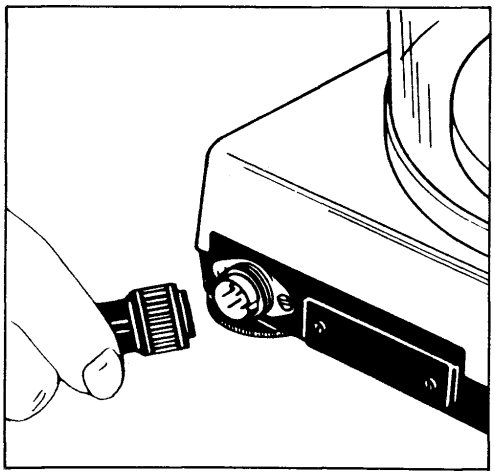
At the point of use, level the balance using the leveling feet **(10)** so that the air bubble is centered within the circle of the level indicator **(9)**.

How to Start up the B 310P and B 310S

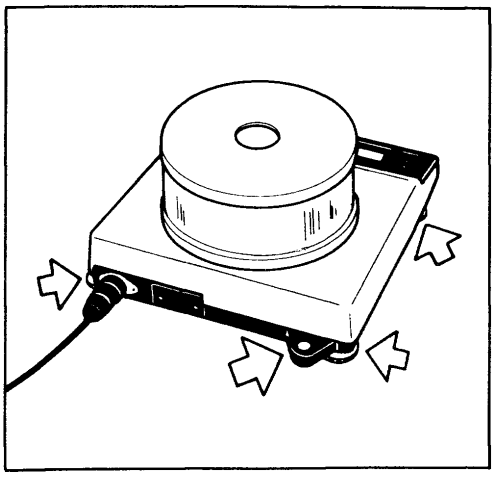
Attach the dust cover by pressing down on the adhesive disks, and install the components **(7, 6, 1, 5 and 4)** one at a time on the balance in the order given.



Your balance is powered by an AC adapter.
Make sure that the voltage rating printed on this unit is identical to your local line voltage rating.



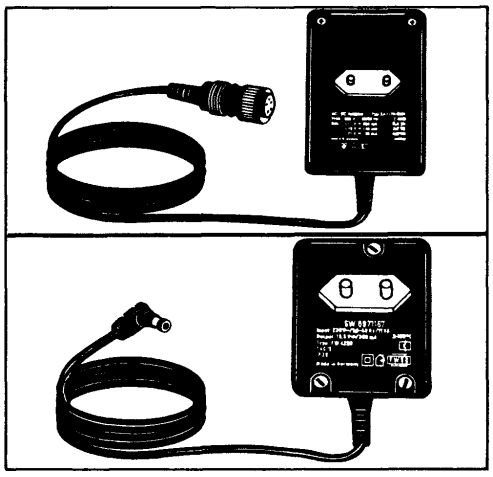
Plug the cord of the AG adapter into the power receptacle of the balance. Now plug the AC adapter into an electrical or wall outlet.



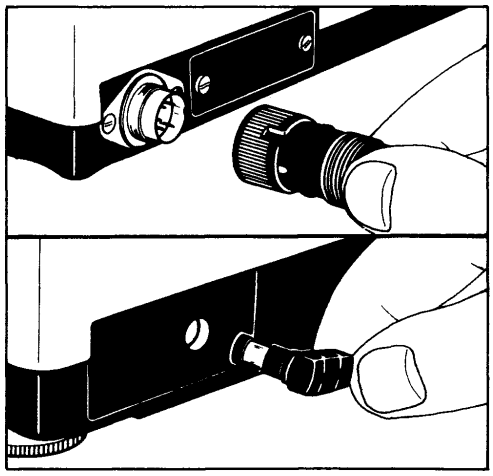
At the point of use, level the balance using the leveling feet **(10)** so that the air bubble is centered within the circle of the level indicator **(9)**.

How to Start up the B 410, B 610, B 3100P/S, B 4100 and B 6100

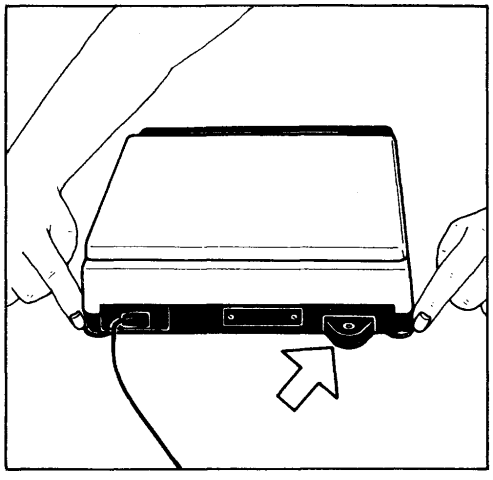
Attach the dust cover by pressing down on the adhesive disks, and place the weighing pan **(1)** on the balance.



Your balance is powered by an AG adapter.
Make sure that the voltage rating printed on this unit is identical to your local line voltage rating.



Plug the cord of the AC adapter into the power receptacle of the balance. For models B 410 and
B 610, secure the connection by tightening the knurled collar.
Now plug the AC adapter into an electrical or wall outlet.



At the point of use, level the balance using the leveling feet (10) so that the air bubble is centered within the circle of the level indicator **(9) (only for models B 3100P and B 31OOS).**

Operation

The weight display shows the following special messages for your information:

BUSY
The balance processor is still busy processing a function and will not accept any other commands to perform functions at this time.

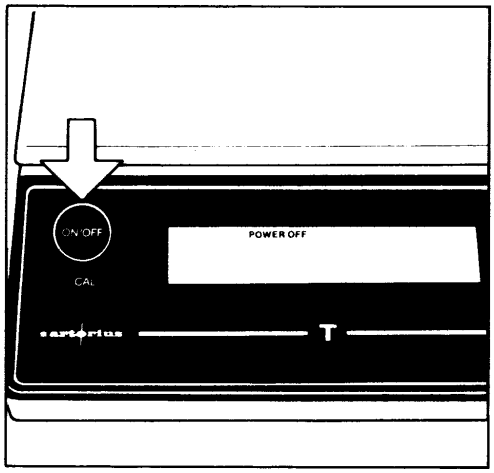
STANDBY
The balance has been turned off with the ON/OFF key **(15)** and is now in the STANDBY mode and ready to operate without warmup.

POWER OFF
The balance was disconnected from line power (reconnection to line power after the balance was unplugged, power failure or outage).

CAL
The calibration function has been activated.

In addition to grams, this balance gives you a variety of other menu-definable international weight unit options.

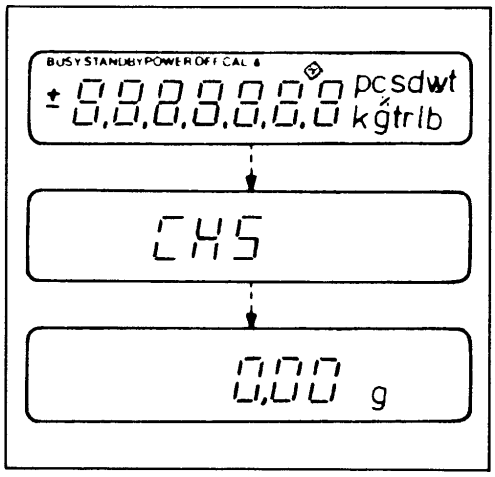
Select the menu code for the particular unit of weight you need from the fable given for the balance operating program, and set the appropriate code as described in the section "Balance Operating Program."



Press the ON/OFF key **(15)** to turn the balance on or off.

You can also turn it on by pressing the tare control **(13)**.

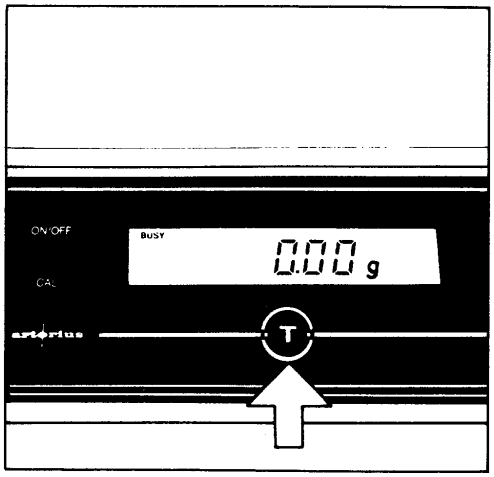
After the balance has been plugged into a wall outlet using the adapter, the weight display will go out whenever you turn off the power. All other electronic circuits will remain energized (indicated by STANDBY). This means the balance is immediately ready to operate without requiring warmup the next time you turn it on.



After the power is turned on, an automatic self-test of all essential electronic functions is performed.

This self-test ends with one of the following readouts:
0.0000 g/0.000 g/0.00 g/0.0 g (one of these readouts will be obtained if the program code setting 5 1 1 is used).

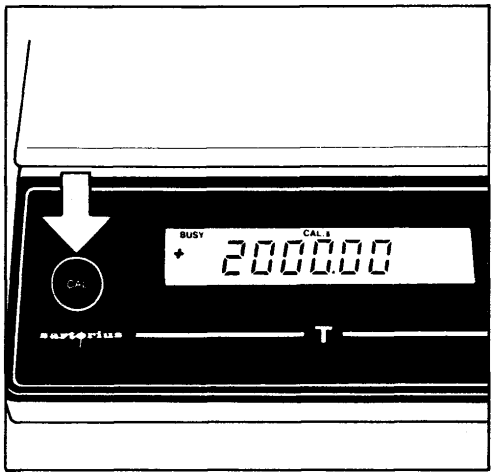
Now place your sample or item on the pan **(1)** to determine its weight. Read off the weight in the display **(16)** as soon as the weight unit (in this case "g") appears as the stability symbol.



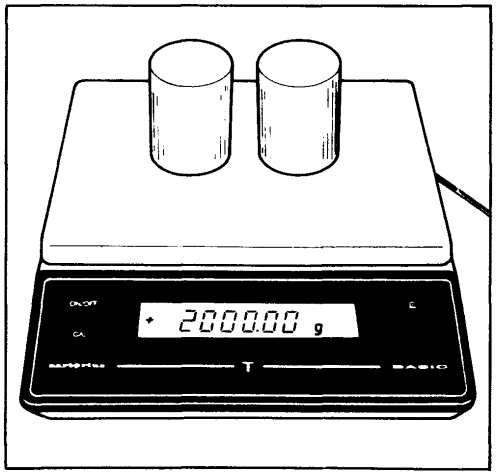
If you wish to use a Container or if the weight display does not indicate 0.0000 g/0.000 g/0.00 g/0.0 g (or the equivalent with the weight unit of your choice), press the tare control to zero the display.

Calibration

- Only possible with an accurate calibration weight
(B 120S — 100 g; B 310P — 200 g; B 310S,
B 410 — 300 g; B 610 — 500 g; B 3100P/S,
B 4100 — 2,000 g; B 6100 — 5,000 g) – see "Accessories" –



Unload the balance and press the CAL key **(14)** for at least 3 seconds until the calibration weight readout appears in the display.



Center the calibration weight on the weighing pan.
Now the weight unit symbol is displayed. An acoustic Signal indicates the end of the calibration procedure.

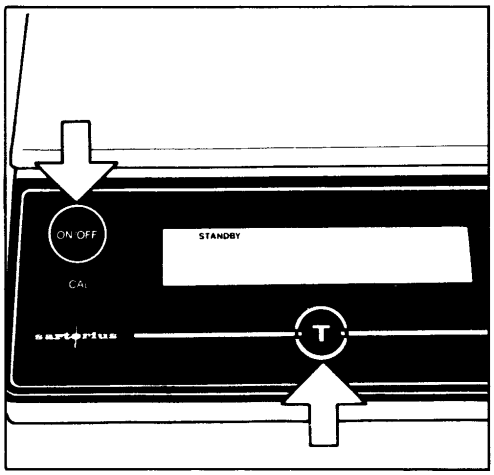
Access to the calibration function can be blocked.
To find this menu code, please refer to the "Balance Operating Program." (This function is accessible when ever the balance operating program is in the **"C"** or change mode).

Balance Operating Program

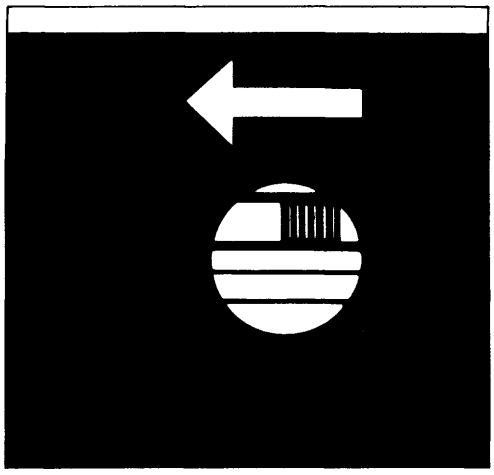
The balance operating program lets you adapt your balance to various ambient conditions and requirements and select weight units commonly used in your country.

At the factory, we have set the codes for a Standard program, which is protected by a program lock to prevent accidental changes.

The **"code"** contains the information of the operating program, It consists of three digits known in "computerese" as the "page" (1st digit),the "line" (2nd digit) and the "word" (3rd digit).



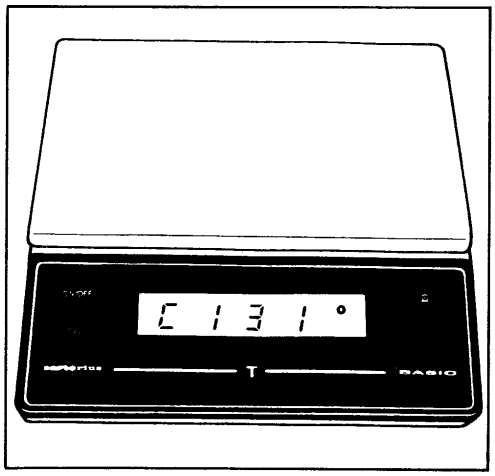
How to access the balance operating program:
With the balance turned off **(STANDBY** state) hold down the tare control **(13)** while you press the ON/OFF key **(15)**. Upon completion of the automatic self-test, release the tare control as soon as **"CH5"** is displayed. The Status of the balance operating program will be indicated in the weight display.
"L" Stands for the list mode.
In this mode, you can check the code settings, but you cannot program new codes. If you wish to change a program code, you must first unlock the menu access switch to access the program menu.



To do so, remove the protective cap located on the lower front panel on the right of the balance, and slide the menu access switch **(12)** in the direction of the arrow.

The display will indicate **"C,"** which Stands for the change mode, meaning you can now change a menu code setting.

After you have accessed the menu of the balance operating program, the display will show a continuous sequence of numbers from 0-5 for the "page" or first digit of the code, in addition to the Status code letter **"L"** or **"C."**
When the first digit of the code you wish to check or change appears, press the tare control **(13)**.
The "page" code number (1st digit) now stops in the display, and a series of numbers for the 2nd digit or "line" will begin to cycle. Press the tare control again to stop the code number of your choice in the display. Next, the numbers for the "word" (last digit) will cycle in the display. Repeat the procedure to enter the last digit of the code.



The "o" symbol that appears indicates the actual setting.

To change any menu code settings ("C" mode), press the tare control as soon as the appropriate code is displayed.

Brief display of BUSY and the "o" symbol confirms you selection, followed by a return to "zero" for the 2nd digit or "line."

How to return to the weighing mode:
Press the tare control each time a "0" appears in the numerical sequence (word, line, page). If you have changed a menu code, it will be stored as soon as the display returns to the weighing mode. Lock the balance operating program using the menu access switch (**"L"** readout), and replace the protective cap.

Auto Zero

This balance has an automatic zero tracking function known as "Auto Zero."
Any changes off zero ≤± 2 digits (B 120 S),
± 1 digit (B310P/S) or ± 0.5 of a digit (B410,B610, B 3100 P/S, B4100 or B6100) per second will be automatically set to zero.

Menu of the Balance Operating Program
(Active Parameters)

Code	Ambient Conditions	Factory setting
C 1 1 1	Very stable (B 410, B 610)	■
C 1 1 2	Stable	■
C 1 1 3	Unstable	
C 1 1 4	Very unstable	

Code	Stability Range		Factory setting
C 1 2 1	0,25	digit	
C 1 2 2	0,5	digit	
C 1 2 3	1	digit	
C 1 2 4	2	digits(B 120S)	■
C 1 2 5	4	digits	■
C 1 2 6	8	digits	
C 1 2 7	16	digits	
C 1 2 8	32	digits	
C 1 2 9	64	digits	

Code	Display Format	Factory setting
C 1 3 1	Last decimal ON	■
C 1 3 2	Last decimal OFF	
C 1 3 3	Last decimal at stability	
C 1 3 4	All decimals at stability	

Code	Tare parameter	Factory setting
C 1 4 1	Without stabilty	
C 1 4 2	At stability	■

Code	Auto Zero	Factory setting
C 1 5 1	ON	■
C 1 5 2	OFF	

Code	Calibration	Factory setting
C 1 6 1	Accessible	■
C 1 6 2	Accessible blocked	

Code	Program Lock	Factory setting
C 4 1 1	OFF	
C 4 1 2	ON	■

Code	Acoustic Signal	Factory setting
C 4 3 1	ON	■
C 4 3 2	OFF	

Code	Weight Units[1])		Factory setting
C 5 1 1	Grams	g	■
C 5 1 2	Kilograms	kg	
C 5 1 3	Carats	ct	
C 5 1 4	Pounds	lb	
C 5 1 5	Ounces	oz	
C 5 1 6	Troy ounces	ozt	
C 5 1 7	Parts/pound	o	
C 5 2 1	Hong Kong taels	tl	
C 5 2 2	Singapore taels	tl	
C 5 2 3	Taiwan taels	tl	
C 5 2 4	Grains	gr	
C 5 2 5	Pennyweights	dwt	
C 5 2 6	Mommes	o	
C 5 2 7	Milligrams	o	
C 5 2 8	Austrian carats	o	

C 5 2 0	Call Program Line
C 5 0	Call Program page
C 0	**End of programming**

Additional Parameters for the data Output format at the interface port and for calculation programs are available on request.-Please refer to the “Accessories."

[1]) **You can choose any weight unit as long as it can be displayed in the particular weighing range you selected (for example do not set the code for "kg" when you are using a 0.1 mg balance).**

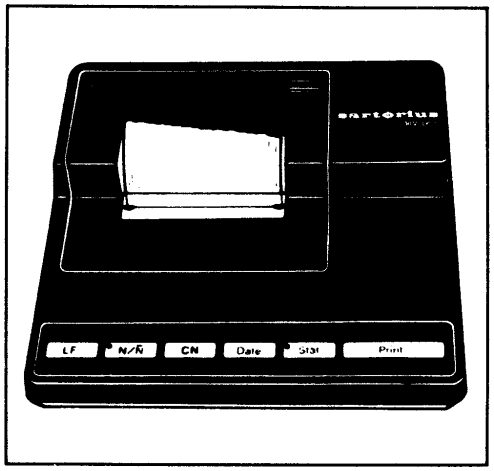
Troubleshooting Guide

Problem ...	**Causes ...**	**Remedy**
No segments appear in the weight display **(16)**	- No line voltage available - The AC adapter has not been plugged in	- Check current supply - Plug in the AC adapter
Weight display shows **"L"** or **"CH2"**	- The pan **(1)** is not in place	- Place the pan
Weight display shows **"H"**	- Load exceeds capacity of the balance	- Unload the balance
The weight readout changes constantly or the special message **"BUSY"** does not go out in the weight display	- Unstable ambient conditions - Too much vibration or there is a draft - The door of the weighing chamber is not completely closed (for B 120S) - The sample or object does not have a stable weight	- Set up scale in another area - Access the menu to adapt scale to the particular type of weighing environment - Close the door of the weighing chamber
The weight display shows **"CE"**	- The CAL key **(14)** was not pressed when the display read zero - The balance is loaded	- Press tare control **(10)** and re-press the CAL key - Unload the balance
The weight readout is obviously wrong	- The balance has not been calibrated - The balance has not been tared before weighing - Scale has not been tared before weighing - The air bubble of the level indicator **(9)** is not within the circle (only for B 120S, B 210P/S, B 3100P/S)	- Calibrate the balance - Tare before weighing - Level the balance

Accessories (Options)

Interface

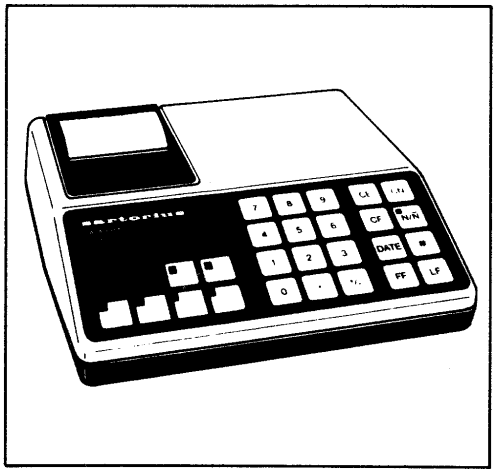
— for B 120S	YDO 01A
— for B 310P/S, B 410, B 610	YDO 01L
— for B 3100P/S, B 4100, B 6100	YDO 01U



Data printer with date/time and statistics functions — YDP 02-0D

Print speed
approx.lines/sec.1.5

Printer housing (W x D x H)
in mm 150 x 138 x 43
in inches5.9 x 5.4 x 1.7



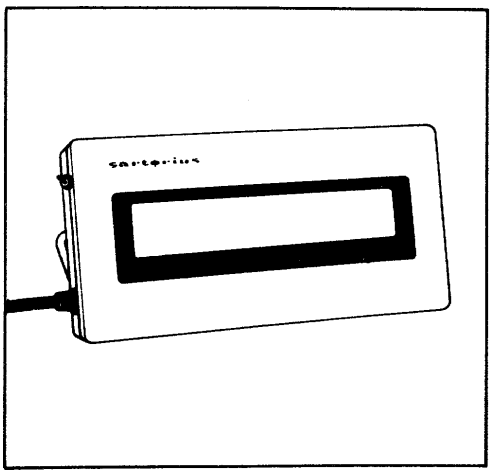
Data printer with set of programs; to order, replace & with one of the codes below: — 73802 &

= 201 for animal weighing

= 207 for formulation & compounding

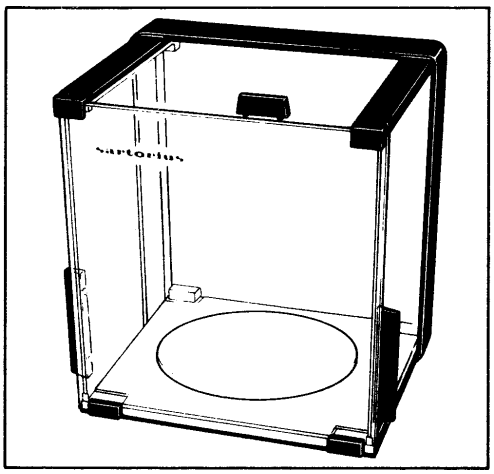
= 206 for parts counting

= 203 for mass unit conversion



Remote display
(plugs into the interface connector of the balance)

— LCD(reflective)	737101A
— for over head projectors	737102A



Special draft shield chamber (only for B 31OP/S)	YDS 01L

Calibration weights for:	
B 120S (1 x 100 g)	7072 19
B 310P (1 x 200 g)	7072 20
B 310S, B 410 (4 x 100 g)	7072 04
B 610 (1 x 500 g)	7072 16
B 3100 P, B 3100 S, B 4100 (2 x 1,000 g)	7072 08
B 6100(1 x 5,000 g)	7072 13
External rechargeable battery pack; approx. 12 hours of Operation; rechargeable via AC adapter (only for B 3100S/P, B 4100, B 6100)	YRB 01Z
Carrying case	
— forB120S	YDB 01A
— for B 310 P/S	YDB 01L
— for B 410,B 610, B 3100 P/S, B 4100, B 6100	YDB 02L
Antitheft locking device	6087
Specific gravity determination kit (only for B 120S)	6080
Weighing pan device to prevent distortion caused by magnetic fields (only for B 120S)	YWP 01A
Special pan (155 mm Ø) for weighing electro statically charged samples (only for B 120S)	YWP 01A-0001

Specifications

Model		B 120S	B 310P	B 310S
Capacity/weighing range	g	121	60/120/310	310
Readability	g	0.0001	0.001/0.002/0.005	0.001
Tare range (by subtraction)	g	-121	-310	-310
Standard deviation	g	≤±0.0001	≤±0.001/0.001/0.0025	≤±0.001
Max. linearity	g	≤±0.0002	≤±0.0015/0.002/0.005	≤±0.002
Stabilization time (typical)	s	3	2	2
Display update	s	0.1 – 0.8 (selectable)		
Adaption to ambient conditions and application requirements		by selection of one of 4 optimized filter levels		
Stability range	d	0.25 ... 64 (selectable)		
Ambient temperature range	K	283 – 303 (+10°C ... +30°C)	273 – 313 (0°C ... +40°C)	
Allowable relative humidity		25 ... 85 (moisture-proof rating)	15 … 85	
Sensitivity drift within +10 … +30°C	/°C	$\leq\pm2\cdot10^{-6}$	$\leq\pm5\cdot10^{-6}$	$\leq\pm2\cdot10^{-6}$
Pan size	mm/in.	Ø 90/3.5	Ø 130/5.1	Ø 130/5.1
Balance housing (W x D x H)	mm in.	230 x 291 x 287 9.1 x 7.2 x 8.2	220 x 235 x 60 8.7 x 9.3 x 2.4 (with draft shield: height: 127 mm or 5”)	
Balance chamber (W x D x H)	mm in.	200 x 184 x 209 7.9 x 7.2 x 8.2		
Net weight	kg/lbs.	7/15.4	4.5/9.9	4.5/9.9
Power requirements (voltage + frequency)		115 or 230 V depending on the AC adapter used 50 – 60 Hz		
Allowable voltage fluctuation		-20% … +15%		
Power consumption(typical)	VA	max. 13	7	7
Interface (optional)		RS 232 C/V24 – 28, RS 423/V10; 7-bit; parity: even, mark, odd, space; transmissions rate: 150 ... 9,600 Baud		

Specifications

Model		**B 410**	**B 610**	**B 3100P**
Capacity/weighing range	g	410	610	600/1,200/3,100
Readability	g	0.01	0.01	0.01/0.02/0.05
Tare range (by subtraction)	g	-410	-610	-3,100
Standard deviation	g	≤±0.005	≤±0.005	≤±0.01/0.01/0.025
Max. linearity	g	≤±0.01	≤±0.01	≤±0.015/0.02/0.05
Stabilization time (typical)	s	1.5	1.5	2
Display update	s	0.1 – 0.8 (selectable)		
Adaption to ambient conditions and application requirements		by selection of one of 4 optimized filter levels		
Stability range	d	0.25 ... 64 (selectable)		
Ambient temperature range	K	273 – 313 (0°C ... +40°C)		
Allowable relative humidity		15 … 85 (moisture-proof rating)		
Sensitivity drift within +10 … +30°C	/°C	$\leq \pm 5 \cdot 10^{-6}$		
Pan size	mm in.	211 x 169 8.3 x 6.7		235 x 180 9.3 x 7.1
Balance housing (W x D x H)	mm in.	220 x 235 x 60 8.7 x 9.3 x 2.4		250 x 270 x 65 9.8 x 10.6 x 2.6
Net weight	kg/lbs.	4/8.8	4.5/8.8	5/11
Power requirements (voltage + frequency)		115 or 230 V depending on the AC adapter used 50 – 60 Hz		
Allowable voltage fluctuation		-20% … +15%		
Power consumption(typical)	VA	max. 7	7	7.5
Interface (optional)		RS 232 C/V24 – 28, RS 423/V10; 7-bit; parity: even, mark, odd, space; transmissions rate: 150 ... 9,600 Baud		

Specifications

Model		B 3100S	B 4100	B 6100
Capacity/weighing range	g	3,100	4,100	6,100
Readability	g	0.01	0.1	0.1
Tare range (by subtraction)	g	-3,100	-4,100	-6,100
Standard deviation	g	≤±0.01	≤±0.05	≤±0.05
Max. linearity	g	≤±0.02	≤±0.1	≤±0.1
Stabilization time (typical)	s	2	1.5	1.5
Display update	s	0.1 – 0.8 (selectable)		
Adaption to ambient conditions and application requirements		by selection of one of 4 optimized filter levels		
Stability range	d	0.25 ... 64 (selectable)		
Ambient temperature range	K	273 – 313 (0°C ... +40°C)		
Allowable relative humidity		15 … 85 (moisture-proof rating)		
Sensitivity drift within +10 … +30°C	/°C	$\leq \pm 2 \cdot 10^{-6}$	$\leq \pm 5 \cdot 10^{-6}$	$\leq \pm 5 \cdot 10^{-6}$
Pan size	mm in.	235 x 180 9.3 x 7.1		
Balance housing (W x D x H)	mm in.	250 x 270 x 65 9.8 x 10.6 x 2.6		
Net weight	kg/lbs.	5/11	3.5/7.7	3.5/7.7
Power requirements (voltage + frequency)		115 or 230 V depending on the AC adapter used 50 – 60 Hz		
Allowable voltage fluctuation		-20% … +15%		
Power consumption(typical)	VA	max. 7.5	7.5	7.5
Interface (optional)		RS 232 C/V24 – 28, RS 423/V10; 7-bit; parity: even, mark, odd, space; transmissions rate: 150 ... 9,600 Baud		

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